

## The Study of the Extent of Injury to the Lower Limbs and the Investigation of its Causes in the Garrison Troops in the North East of Country, Iran

Mohammadreza Shakeri<sup>1</sup>, Gilda Barzin<sup>2</sup>,  
Daryoush Mehdibarzi<sup>3</sup> and Ehsan Fallah<sup>4\*</sup>

<sup>1</sup>Department of Orthopaedic and Trauma Surgery,  
Birjand University of Medical Sciences, Birjand, Iran

<sup>2</sup>Resident of Anesthesiology, Tehran University of Medical Sciences, Tehran, Iran

<sup>3</sup>Department of orthopaedic and trauma surgery,  
Shahed University of Medical Sciences, Tehran, Iran

<sup>4</sup>Department of Orthopaedic and Trauma Surgery, AJA University of Medical Sciences, Tehran, Iran.

doi: <http://dx.doi.org/10.13005/bbra/1530>

(Received: 06 September 2014; accepted: 11 October 2014)

Since the physical health of the armed forces is essential for their performance, access to reliable information on their physical condition is required. The lower muscles are one of the most vulnerable areas due to the high pressures of military exercises. The aim of this study was to determine the incidence of injuries and its relationship with the military activities of the lower limbs in garrison military personnel in the North East of Country. Nordic questionnaire was localized for this study and distributed among military personnel. After collecting the questionnaires, data was evaluated and analyzed using SPSS software. There is a significant relationship between height, weight, and long-standing and the amount of pain in the lower limbs. There is a significant relationship between the amount of pain in the lower limbs and some military activities such as long-standing.

**Key words:** Pain, Military, Parade, Painkiller

Having balance in life is one of the most important issues of everyday life that returns more to the people standing. Balance during standing is considered as one of the important cases in motion<sup>1</sup>. The sensory information of joint range of motion and muscle strength plays an important role in the balancing<sup>2-3</sup>. Exercise and balance movements are important in keeping limbs healthy and balance exercises on one leg or on different surfaces are such exercises<sup>4-5</sup>. The differences in the proprioception of ankle and knee

among athletes and people who do not exercise indicate that exercises affecting sensory-motor system increase balance<sup>6-7</sup>. But people may experience some problems and discomfort in their life that can significantly affect their lives<sup>3, 8-10</sup>.

Musculoskeletal pain and discomfort is one of the most important pains in the modern societies<sup>11-12</sup>. So that nowadays, mobility and physical activity on the one hand and exposure to stressful situations caused by great concerns and industrial life on the other hand, have led many physical and psychological effects including musculoskeletal pain and discomfort caused by that to increase markedly<sup>11, 13-14</sup>. The prevalence of musculoskeletal pain has been reported about 10 to 20%<sup>15-16</sup>.

\* To whom all correspondence should be addressed.  
Tel.: +989125548853;  
E-mail: fallah\_e@razi.tums.ac.ir

Period of military service is one of the trainings required for men in Iran in which a range of intensive military trainings, including parade, individual combat and fitness are usually done to enhance the efficiency and capabilities of individuals in the training centers. Activities such as long sitting, long standing, jumping from a height, running and hard physical exercises are among activities performed during this period. Due to the compression of trainings and relatively lowest periods among them, one of the more commonly cases seen in soldiers and military personnel is mild and severe injuries to the lower limbs. In many cases, symptoms of the loss of proprioception such as decrease in balance and instability in the joints of the lower limbs are seen after injury. According to reports, 5 most damages during military training are stress syndrome (23.8%), muscle cramps (8.6%), ankle sprain (6.3%), knee injury resulted from overuse (9.5%) and fractures resulted from stress (3%). The results of this study indicate that injuries caused by weight-bearing exercise such as jumping and parade are high and the more the time of exercises, the more the injuries. Many musculoskeletal injuries are caused by the accumulation of very small damages generated during overtraining and continuous and repetitive activities. According to research by Sherry and Malleson, about 16 percent of soldiers have musculoskeletal pain and discomfort in their limbs which are often chronic and their cause is unknown. So overall, the problem of musculoskeletal pain and disorder is a fundamental problem<sup>15, 17-18</sup>. The aim of this study was to determine the incidence of lower limb injuries in military personnel in one of the military garrisons in the North East of Country. The other objective of this research is to find the possible reasons related to the injuries.

## METHODS

To do this study, standard questionnaires were firstly collected and among them, Nordic standard questionnaire was chosen as the base for this study. The questionnaire consisted of three main parts including demographic information, pain review in the past and pain review in the present. In the first part, there is personal information such as age, height, weight, etc and other additional information that will help to analyze the data. For example there are some

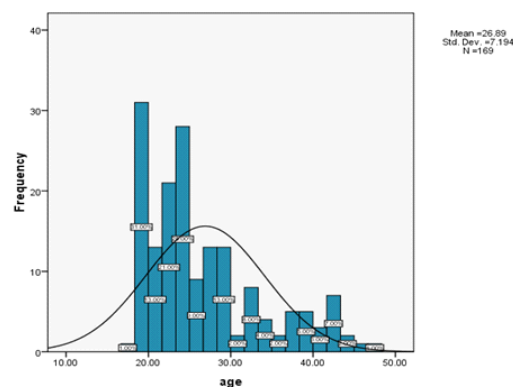
questions about education and knowledge of correct working principles, left-or right-handedness, previous job, history of diseases, hours of exercise per week and smoking in this part. The result of the part and its analysis can help to analyze the main questions.

The second part includes questions about the history of pain in the past and the third part asks questions about the status of people during military service or military administrative activities. If a person has a pain in each area of his lower limbs, he will mark that part. In the next questions, the possible cause of pain or the time when the pain increases is asked. It should be noted that Nordic questionnaire covers all upper and lower limbs, but according to the purposes of this study, the second and third parts were rewritten for the assessment of pain in the lower limbs. The questionnaires were distributed among personnel and daftees in Birj and garrison in the period from February and March 2013. How to fill the questionnaire was explained to them. Musculo skeletal complaint is defined as any kind of pain or weakness or numbness in the musculo skeletal system which requires rest more than one day or using pain killer or going to the doctor. Of course, the officers were given the assurance that their personal information will remain confidential. Data was analyzed using SPSS statistical software.

## RESULTS

169 patients participated in this observational sectional study with a mean age of 26.89 years old (Fig 1).

The statistical study performed by the



**Fig. 1.** Frequency distribution of age in a 169 person sample

software "SPSS" Version 16 and using "McNemar" statistical test to assess pain in thirteen different areas (toes of left foot, toes of right foot, sole and over the right foot, sole and over the left foot, right ankle, left ankle, left leg muscles, right leg muscles, left thigh muscles, right thigh muscles, left knee, right knee, hip muscles) showed that there is no statistical relationship between the pain in mentioned parts before and after the entry into military service ( $P\text{-Value} > 0.05$ ). About 60 percent of people know the long-standing as the cause of pain caused and other factors such as working with computer or long sitting, mountaineering and educational activities such as parade, crawl, passing obstacles and etc had less involvement in their pain. In the people, the most of the pain sensation has been reported in knees. Thus, the left knee with the relative frequency of 16 percent and right knee with the relative abundance of 14 percent had the highest proportion of the pain sensation. Use of pain killers among these patients is very common, so that about 58 percent of them use painkiller to reduce pain in different areas. The effect of these drugs to reduce the pain of left knee was a statistically significant difference ( $p\text{-value} < 0.05$ ). It is while that no effect was seen to relieve the pain in the other areas by taking these drugs.

### DISCUSSION

Fitness and severe physical activities are integral part of training and activities during military service. Activities such as working with computer or prolonged sitting or standing, mountaineering, running and training activities such as parade, crawl, passing obstacles are embedded in the daily programs of military forces. These activities with their all benefits cause damage to various parts of the body. One of the parts exposed to the hardest damage is feet. Long standing, mountaineering and parade are among the activities that cause damage to the lower limbs. In this study, long standing is the main reason for pain in the lower limbs. Pain is seen in the various parts of the lower limb, but the highest rate of pain has been reported in the knees that could be because of standing, mountaineering or parade.

Similar studies around the world have proved that such activities will cause damage to

limbs, especially the lower ones. In a study, Whittefied has reported the prevalence of musculoskeletal pain and discomfort 18/5 percent, during one week over 140 people in New Zealand. Based on this study, the most common cause of pain was backache, and then knee pain<sup>19</sup>. In another study, Watson has reported the amount of musculoskeletal disorders and especially backache over 1446 soldiers<sup>20</sup>. Also Murphy has reported the disorders of the spinal cord over 679 soldiers during the previous month.

### CONCLUSIONS

Intense physical activities in military personnel cause damage to the lower limbs. Damage to the knee is the most important one. Since the health of military personnel is essential in the increase of Country's defensive power, so some measures should be thought to minimize activities such as prolonged standing and sitting.

### ACKNOWLEDGMENTS

AJA University of Medical Sciences, Tehran, Iran.

### REFERENCES

1. Distefano, M.C., *Disorders of the Patellofemoral Joint*. The Journal of Bone & Joint Surgery, 2005; **87**(2): p. 482-482.
2. Buuck, D.A. and J.P. Fulkerson, *Disorders of the Patellofemoral Joint*. Lippincott Williams & Wilkins. 2004.
3. Csintalan, R.P., *et al.*, Gender differences in patellofemoral joint biomechanics. *Clinical Orthopaedics and Related Research*, 2002; **402**: p. 260-269.
4. Tiberio, D., The effect of excessive subtalar joint pronation on patellofemoral mechanics: a theoretical model. *Journal of Orthopaedic & Sports Physical Therapy*, 1987; **9**(4): p. 160-165.
5. Fulkerson, J.P., D.A. Buuck, and W.R. Post, *Disorders of the patellofemoral joint*. Lippincott Williams & Wilkins Philadelphia, 2004.
6. Diduch, D.R. and A. Gerdeman, *Disorders of the Patellofemoral Joint*. The Knee: A Comprehensive Review, 2010: p. 195.
7. Mackie, H. and S. Legg, Postural and subjective responses to realistic schoolbag carriage.

- Ergonomics*, 2008; **51**(2): p. 217-231.
8. Heir, T. and P. Glomsaker, Epidemiology of musculoskeletal injuries among Norwegian conscripts undergoing basic military training. *Scandinavian journal of medicine & science in sports*, 1996; **6**(3): 186-191.
  9. Dorotka, R., *et al.*, The patellofemoral pain syndrome in recruits undergoing military training: a prospective 2-year follow-up study. *Military medicine*, 2003; **168**(4): p. 337-340.
  10. Brushøj, C., *et al.*, Prevention of Overuse Injuries by a Concurrent Exercise Program in Subjects Exposed to an Increase in Training Load A Randomized Controlled Trial of 1020 Army Recruits. *The American journal of sports medicine*, 2008; **36**(4): p. 663-670.
  11. Campbell, W.C. and A.H. Crenshaw, Campbell's operative orthopaedics. 1987: Mosby.
  12. Songer, T.J. and R.E. LaPorte, Disabilities due to injury in the military. *American Journal of Preventive Medicine*, 2000; **18**(3): p. 33-40.
  13. Population, N.R.C.C.o.t.Y., *et al.*, Assessing fitness for military enlistment: Physical, medical, and mental health standards. National Academies Press, 2006.
  14. Petersen, E.J. and K.C. Smith, Benefits of a musculoskeletal screening examination for initial entry training soldiers. *Military medicine*, 2007; **172**(1): 92-97.